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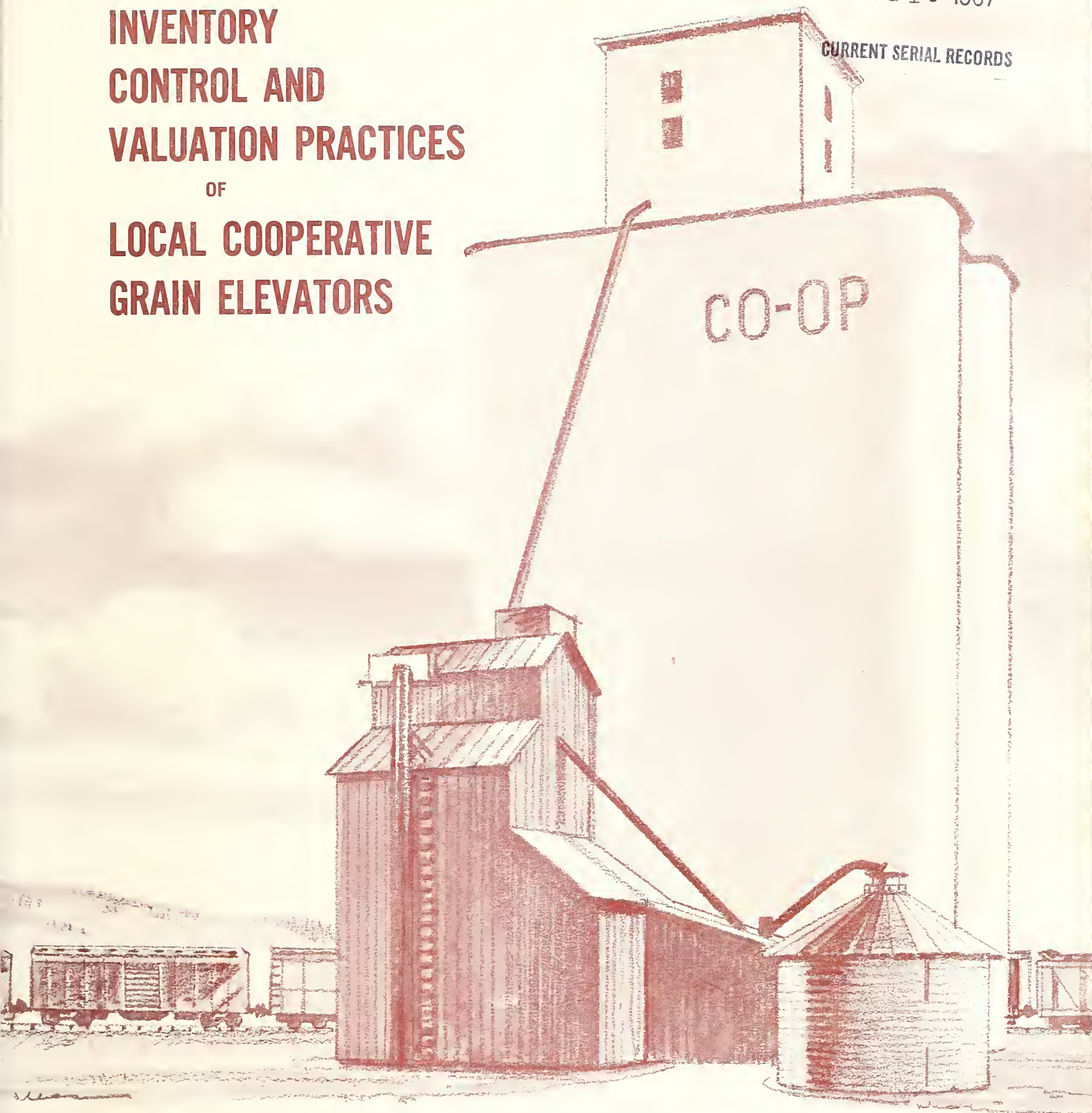
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**INVENTORY  
CONTROL AND  
VALUATION PRACTICES  
OF  
LOCAL COOPERATIVE  
GRAIN ELEVATORS**

CURRENT SERIAL RECORDS

CO-OP



GENERAL REPORT NO. 142

FARMER COOPERATIVE SERVICE • U. S. DEPARTMENT OF AGRICULTURE



FARMER COOPERATIVE SERVICE  
U.S. DEPARTMENT OF AGRICULTURE  
WASHINGTON, D.C. 20250

Farmer Cooperative Service conducts research; advises directly with cooperative leaders and others; promotes cooperative organization and development through other Federal and State agencies; and publishes results of its research, issues News for Farmer Cooperatives, and other education material.

This work is aimed (1) to help farmers get better prices for their products and reduce operating expenses, (2) to help rural and small-town residents use cooperatives to develop rural resources, (3) to help these cooperatives expand their services and operate more efficiently, and (4) to help all Americans understand the work of these cooperatives.

GENERAL REPORT 142  
JULY 1967





# CONTENTS

	Page
Highlights . . . . .	vi
Method and Scope . . . . .	1
Characteristics of respondents . . . . .	3
Inventory procedures . . . . .	7
Frequency of taking inventory . . . . .	7
Responsibility for taking inventory . . . . .	7
Methods of taking inventory . . . . .	9
Reconciling the books . . . . .	10
Inventory prices . . . . .	10
Methods of pricing . . . . .	10
Selecting a pricing procedure . . . . .	11
Grain quality in pricing inventories . . . . .	13
Shrinkage of grain inventories . . . . .	14
Estimating shrinkage . . . . .	14
Trend in shrinkage . . . . .	14

## HIGHLIGHTS

As the grain merchandising and storage industry has become more competitive, it has become necessary for local cooperative elevators to establish and maintain better inventory records. Findings of a 17-State study of management techniques being employed by local cooperative elevators were:

- Thirty-one percent of the respondents took inventory only at the end of the fiscal year. However, many cooperatives in Illinois, Indiana, Ohio, Michigan, Nebraska, Kansas, and Colorado took monthly inventories.

- Employees of the cooperatives were in charge of inventory-taking in 22 percent of the cases. This responsibility, however, was often shared with directors and auditors.

- Forty-five percent of the respondents used the measurement method to determine the amount of grain in their upright facilities and 64 percent used it in their flat storage.

- Sixty-seven percent of the respondents allowed a discrepancy of only 0.5 percent between the book inventory and the actual physical inventory.

- The "cost" method of inventory pricing was used by 38 percent of the study group. The "lower of cost or closing central market less freight" method led in Minnesota and Iowa,

while the "closing central market less freight" method was most often used in North Dakota, South Dakota, and Montana.

- Managers decided which method was to be used in pricing inventories in 43 percent of the cooperatives. The managers shared this responsibility with auditors.

- Moisture, dockage, and test weight was the major combination of quality factors used in pricing inventories. Test weight was the leading single quality factor used in pricing; protein content was the least used.

- Seven percent of the respondents used all grading factors in pricing grain inventories; 23 percent did not consider quality during inventory pricing.

- The majority of the respondents used an estimated shrink factor of from 0 to 0.5 percent of the total amount of grain handled for wheat, corn, oats, soybeans, and barley. Most respondents also used a 0.6 to 1.0 percent shrink factor on monthly receipts of grain sorghum, and a 0 to 0.5 percent shrink factor on monthly receipts of rye.

- Seventy-six percent of the study group thought actual shrinkage had remained the same since 1960.



# INVENTORY CONTROL AND VALUATION PRACTICES OF LOCAL COOPERATIVE GRAIN ELEVATORS

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The control and valuation of grain inventories is a major problem for cooperative grain elevators. Management must periodically inspect and assess the amount of grain stored. The inventory control has special application to grain because the quality and quantity of grain can change in a relatively short time as a result of shrinkage, insect or rodent damage, hot spots, and other causes.

The manner in which grain inventory pricing, or valuation, is done has considerable effect on the validity and accuracy of the operating

statement and balance sheet of the cooperative enterprise. The accuracy of the financial statement is dependent on the inventory valuation which, in turn, is dependent on the results of the physical inventory process.

Local cooperative elevators use many methods to control their grain inventories. Practices range from the physical weighing of the grain at least once each year to the use of the perpetual or book inventory (minus shrinkage allowance). The problems that may arise from poor inventory control and valuation procedures are illustrated by one cooperative that accumulated a loss of more than \$50,000 over a 4- to 5-year period due to the lack of proper inventory control and valuation.<sup>2</sup>

## METHOD AND SCOPE

The objectives of this study were (1) to describe various methods of inventory control and valuation, with emphasis on responsibility for administration, on methods of pricing, and on estimating and accounting for shrinkage of grain inventories; and (2) to identify the areas where different methods are used by local

cooperative grain elevators within a 17-State grain-producing region.<sup>3</sup>

Data for the study were secured through questionnaires mailed to local cooperative grain elevators, selected at random from a 17-State region of major grain production (fig. 1). This region accounted for 77 percent of the production and 82 percent of the off-farm sales of corn, wheat, oats, soybeans,

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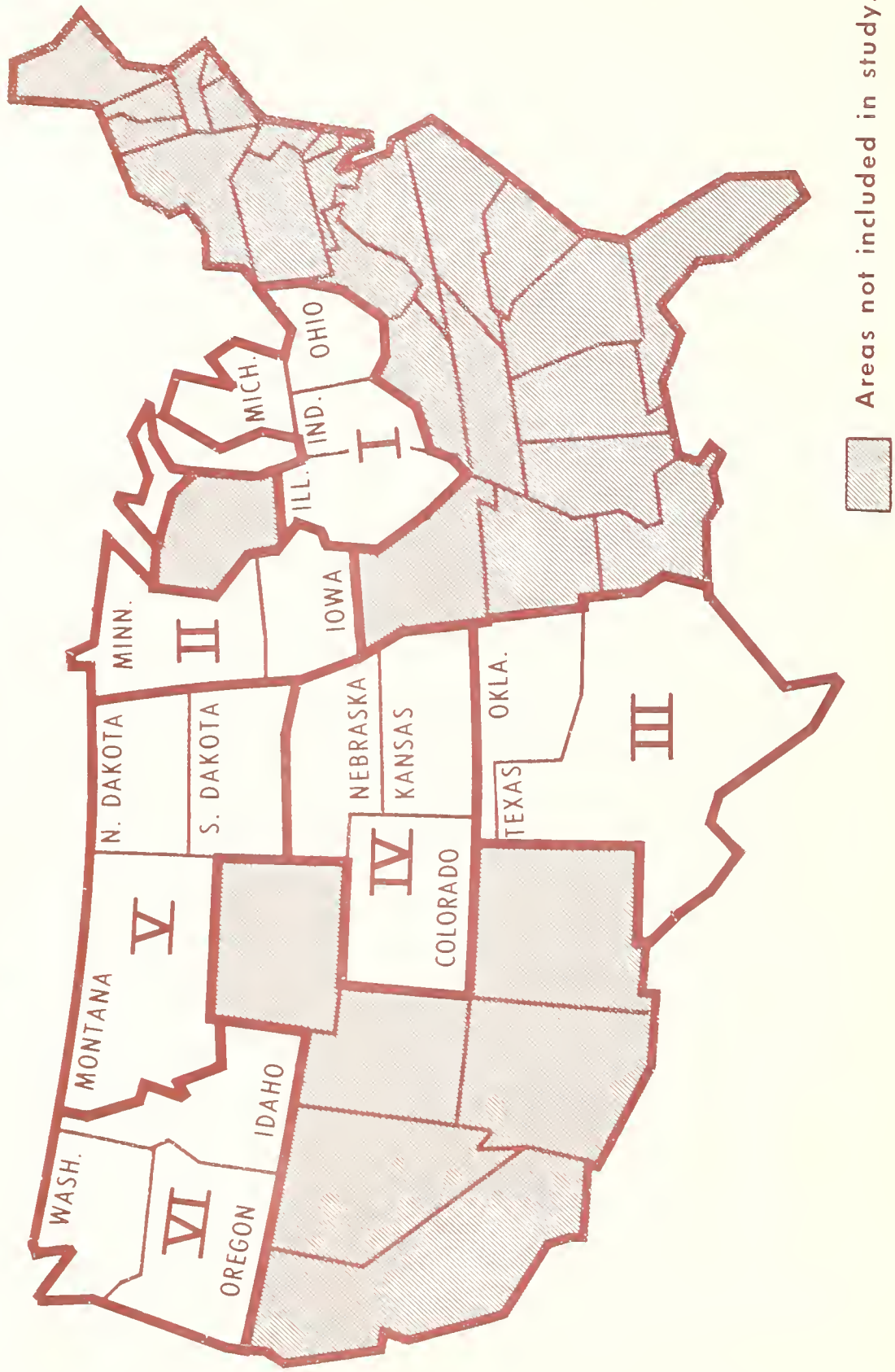
<sup>1</sup>William R. Summitt, formerly with the Grain Branch, Farmer Cooperative Service, constructed the sample and questionnaire used in this study. Valuable information was also provided by the managers of the grain elevators included in the survey.

<sup>2</sup>Omaha Bank for Cooperatives, Don't Neglect That Inventory. The Co-op Bank Messenger, Apr. 1963.

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<sup>3</sup>A local elevator was defined as an elevator that receives a majority of its whole grain from farmers and derives over 50 percent of its gross revenue from handling grain.

**FIG.1--LOCATION OF AREAS  
IN STUDY, 1964-65**



rye, barley, flax, and grain sorghum in 1964.<sup>4</sup> These States include over 80 percent of all local cooperative elevators.

For purposes of the study, the 17-State region was divided into six major grain producing areas according to the major kinds of grain produced and the types of facilities utilized. The major grains produced in each area and the number of respondents in each State are shown in table 1.

Eighty-two percent of the cooperatives in the sample provided information. However,

TABLE 1.--Number of cooperatives providing information in each State, and major grains produced in each area, 1964-65

Area	Number of cooperatives	Major grains
Total	213	---
Area I	36	
Illinois	12	Corn, wheat, soybeans, and oats
Indiana	6	
Michigan	5	
Ohio	13	
Area II	45	
Iowa	26	Corn, soybeans, and oats
Minnesota	19	
Area III	34	
Oklahoma	17	Wheat and grain sorghum
Texas	17	
Area IV	42	
Colorado	3	Wheat, corn, grain sorghum, and soybeans
Kansas	25	
Nebraska	14	
Area V	38	
Montana	4	Wheat, flax, barley, and rye
N. Dakota	20	
S. Dakota	14	
Area VI	18	
Idaho	4	Wheat, barley, and oats
Oregon	7	
Washington	7	

some of the schedules returned were not complete. Data from partially completed schedules were used where the information would add to the findings.

## Characteristics of Respondents

Many cooperatives supplied their financial statements. The statements summarized in tables 2 and 3 show the average size of operations and significance of the inventories for these cooperatives. Area IV showed the lowest average sales, with \$938,031, and Area I the highest, with \$1,797,648 (table 2). There was also a wide range in net savings--from a low of \$23,140 in Area V to a high of \$44,801 in Area IV.

The value of inventories held by the respondents accounted for 53 percent of their current assets and 22 percent of their total assets. The average inventory was \$140,047, but this value ranged from an average of \$67,406 in Area III to \$217,049 in Area V (table 3).

The average storage capacity was greatest in Areas III, IV, and VI; the rate of turnover was greatest in Areas I, II, and V (table 4). The differences may have been due to such factors as the kind of grain produced, the number of grains harvested, history of past storage, existing facilities, sales policy, and transportation facilities.

Most of the respondents were also involved in the farm supply business. The sale of farm supplies was a source of considerable income to cooperative elevators in all the areas studied. Average annual sales of farm supplies ranged from \$234,034 in Area V to \$665,322 in Area I.

Many of the elevators operated grain banks as a service to their members (table 5). This is a system by which a farmer is permitted to deliver a supply of grain to the local cooperative elevator, which stores it temporarily and returns it, or its equivalent, to him in the form of a complete feed. In Area V,

<sup>4</sup> Field and Seed Crops: Production, Farm Use, Sales, Value, by States, 1964-65. U.S. Dept. Agr., Statis. Rptg. Serv., Cr Pr-1(66), May 1966.



TABLE 2.--Average operating statements, selected local farmer grain cooperatives, 1964-65

Item	Area I	Area II	Area III	Area IV	Area V	Area VI	All areas <sup>1</sup>
	<u>Dollars</u>						
Sales	\$1,797,648	\$1,796,370	\$1,179,496	\$ 938,031	\$ (2)	\$1,637,221	\$1,431,098
Less cost of sales	<u>1,683,371</u>	<u>1,707,722</u>	<u>1,107,170</u>	<u>869,558</u>	(2)	<u>1,537,837</u>	<u>1,345,412</u>
Gross commodity savings	114,277	88,648	72,326	68,473	37,065	99,384	85,686
Plus other income	<u>47,072</u>	<u>68,258</u>	<u>79,492</u>	<u>85,097</u>	<u>25,765</u>	<u>88,850</u>	<u>72,314</u>
Gross savings and other income	161,349	156,906	151,818	153,570	62,830	188,234	158,000
Less operating expense	<u>137,622</u>	<u>116,499</u>	<u>113,397</u>	<u>108,769</u>	<u>39,690</u>	<u>163,476</u>	<u>121,181</u>
Net savings	23,727	40,407	38,421	44,801	23,140	24,758	36,819

<sup>1</sup> Excludes Area V respondents.<sup>2</sup> Data not available.

TABLE 3.--Average balance sheet, selected local farmer grain cooperatives, 1964-65

Item	Area I	Area II	Area III	Area IV	Area V	Area VI	All areas
	<u>Dollars</u>						
<u>Assets</u>							
Current assets:							
Cash	\$ 42,485	\$ 34,789	\$ 35,558	\$ 56,338	\$ 5,038	\$ 57,152	\$ 37,484
Inventory	91,894	200,882	67,406	105,104	217,049	128,313	140,047
Other current assets	<u>95,526</u>	<u>97,304</u>	<u>64,782</u>	<u>74,930</u>	<u>77,719</u>	<u>153,789</u>	<u>88,224</u>
Total current assets	229,905	332,975	167,746	236,372	299,806	339,254	265,755
Fixed assets (net book value)	163,305	221,413	380,914	382,138	116,882	501,936	279,200
Other assets	<u>82,339</u>	<u>62,119</u>	<u>131,202</u>	<u>106,193</u>	<u>52,598</u>	<u>87,086</u>	<u>86,054</u>
Total assets	475,549	616,507	679,862	724,703	469,286	928,276	631,009
<u>Liabilities and member equities</u>							
Liabilities:							
Current	132,530	206,612	74,703	159,483	261,191	152,248	169,954
Deferred	<u>47,270</u>	<u>55,686</u>	<u>98,997</u>	<u>105,944</u>	<u>3,370</u>	<u>50,891</u>	<u>63,043</u>
Total liabilities	179,800	262,298	173,700	265,427	264,561	203,139	232,997
Member equities:							
Certified capital	206,242	76,691	282,799	165,949	43,108	337,476	162,897
Surplus and reserve	<u>89,507</u>	<u>277,518</u>	<u>223,363</u>	<u>293,327</u>	<u>161,617</u>	<u>387,661</u>	<u>235,115</u>
Total member equities	295,749	354,209	506,162	459,276	204,725	725,137	398,012
Total liabilities and member equities	475,549	616,507	679,862	724,703	469,286	928,276	631,009

TABLE 4.--Average grain storage capacity, grain received, grain turnover, and farm supply sales, selected local farmer grain cooperatives, 1964-65

State and area	Elevators	Average storage capacity	Grain received	Grain turnover <sup>1</sup>	Sale of farm supplies
	<u>No.</u>	<u>Bu.</u>	<u>Bu.</u>	<u>No.</u>	<u>Dol.</u>
Area I	36	141,042	779,103	5.5	665,322
Indiana	6	63,167	559,670	8.9	795,183
Illinois	12	216,250	982,215	4.5	541,309
Michigan	5	105,300	425,000	4.0	250,000
Ohio	13	121,308	662,178	5.5	869,222
Area II	45	370,956	1,004,959	2.7	342,715
Iowa	26	443,963	1,004,246	2.3	448,561
Minnesota	19	271,053	1,005,936	3.7	166,304
Area III	34	798,348	924,186	1.2	311,483
Oklahoma	17	439,580	648,735	1.5	315,934
Texas	17	1,182,999	1,199,637	1.0	307,402
Area IV	42	555,445	587,336	1.1	405,830
Colorado	3	439,000	1,127,823	2.6	906,571
Kansas	25	684,632	538,618	0.8	318,178
Nebraska	14	350,004	597,871	1.7	405,830
Area V	38	236,632	537,613	2.3	234,034
Montana	4	254,633	516,036	2.0	117,670
North Dakota	20	221,059	527,094	2.4	157,760
South Dakota	14	253,735	565,336	2.2	412,873
Area VI	18	716,441	610,694	0.9	238,492
Idaho	4	624,273	578,456	0.9	151,484
Oregon	7	486,750	528,199	1.1	400,650
Washington	7	998,000	711,611	0.7	113,507

<sup>1</sup> Average bushels of grain received divided by average bushels of storage capacity.

TABLE 5.--Grain bank operations, selected local farmer grain cooperatives, 1964-65

State and area	Average storage capacity	Percentage of all cooperatives that operate grain banks	Cooperatives operating grain banks		
			Percentage that include grain bank grain in inventory	Percentage of grain owned by--	
				Elevators	Producers
	<u>Bushel</u>		<u>Percent</u>		
Area I	141,042	77	81	29	71
Indiana	63,167	85	76	12	88
Illinois	216,250	64	100	100	0
Michigan	105,300	75	100	0	100
Ohio	121,308	23	30	12	88
Area II	370,956	39	89	17	83
Iowa	443,963	44	83	25	75
Minnesota	271,053	32	100	0	100
Area III	798,348	58	79	0	100
Oklahoma	439,580	71	83	0	100
Texas	1,182,999	44	71	0	100
Area IV	555,445	64	85	15	85
Colorado	439,000	67	100	0	100
Kansas	684,632	88	86	9	91
Nebraska	350,004	21	67	67	33
Area V	236,632	6	100	0	100
Montana	254,633	0	0	0	0
North Dakota	221,059	0	0	0	0
South Dakota	253,735	14	100	0	100
Area VI	716,441	36	100	12	88
Idaho	624,273	75	100	0	100
Oregon	486,750	29	100	50	50
Washington	998,000	27	100	0	100



none of the Montana and North Dakota cooperatives surveyed, and only a few of those in South Dakota, operated grain banks. Elevators in Ohio, Indiana, Illinois, and Iowa handled 22 percent of their feed grains through grain

bank operations in 1961.<sup>5</sup> Grain bank holdings are usually included as part of the total cooperative inventory, even though the producers have a definite claim to a certain quantity and quality of grain in the elevator.

## INVENTORY PROCEDURES

The purpose of taking a physical inventory is to check the accuracy of the perpetual inventory as shown on the books of an organization. Discrepancies between the book inventory and the actual inventory that are allowed to go uncorrected will detract from the accuracy of the operating statements and the balance sheet. An overstatement of the grain inventory results in an overstatement of gross margin and net savings. It also increases the value of the current assets in the balance sheet. An understatement distorts in the opposite direction.

A misstatement of the closing inventory may result in an inequitable distribution of patronage refunds. For example, if the ending inventory is overstated in one year, the net savings and patronage refunds will also be overstated for that year. Assuming that the ending inventory of this year is used as the beginning inventory of the second year, and that an accurate ending inventory is made at the end of the second year, the net savings and patronage refunds will be understated. As a result, refunds to patrons at the end of the first year will be larger than justified, at the expense of refunds at the end of the second year.

### Frequency of Taking Inventory

The frequency with which the individual cooperative takes inventory varies with the type of operation.

Most cooperative elevators have a definite schedule for taking inventory. The schedule may be based on a period of time--monthly,

quarterly, fiscal yearend, a set of circumstances--for example, when occupancy is at the lowest level, or both. Thirty-one percent of the respondents in this study took inventory only at the end of their fiscal year (table 6). In Areas I and IV most of the respondents took monthly inventories. Some cooperatives used a combination, the leading combination being at fiscal yearend and when grain storage is at its lowest level. Others reported that they took inventory semiannually, weekly, or every other year.

### Responsibility for Taking Inventory

Taking inventory is an important responsibility, and the delegation of this authority should receive careful consideration by the cooperative's board of directors. The responsibility may be delegated to one individual or it may be shared by more than one person.

The responsibility for the taking of inventory varied among the areas and organizations included in this study. Thirty-five percent of the respondents divided the responsibility between the directors and employees; 22 percent delegated it wholly to an employee; and 14 percent divided it among directors, auditors, and employees (table 7). Auditors were given complete control of taking inventory in 5 percent of the cooperatives, and in many of the cooperatives auditors shared the responsibility with others. The requirement by some

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<sup>5</sup> W. S. Farris and W. H. Stahl, Grain Banking in the Midwest. Purdue Univ. Agr. Expt. Sta. Res. Bul. 781, Aug. 1964.

TABLE 6.--Frequency of taking grain inventories, selected local farmer grain cooperatives, 1964-65

Area	Monthly	Quarterly	Fiscal yearend	Lowest occupancy	Other	Combination <sup>1</sup>
	<u>Number of respondents</u>					
I	17	3	6	0	5	5
II	6	1	19	5	4	8
III	3	6	7	1	4	9
IV	10	6	7	6	4	4
V	1	2	19	6	0	7
VI	<u>3</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>3</u>	<u>2</u>
Total	40	21	61	20	20	35

<sup>1</sup> Combinations of 2 other classifications (for example, quarterly and lowest occupancy).

TABLE 7.--Inventory-taking responsibility, selected local farmer grain cooperatives, 1964-65

Responsibility	Area					
	I	II	III	IV	V	VI
	<u>Number of respondents</u>					
Director and employee	8	21	4	11	23	1
Employee	15	6	4	8	4	6
Director, auditor, and employee	8	9	7	2	2	0
Auditor and employee	3	1	0	3	1	5
Auditor	0	2	6	1	0	1
Director	0	2	1	2	4	0
Director and auditor	1	2	2	1	0	0
Inspector <sup>1</sup> and auditor	0	0	2	2	0	2
Inspector, <sup>1</sup> director, and employee	0	0	1	4	0	0
Inspector <sup>1</sup> and employee	0	1	1	2	0	0
Inspector, <sup>1</sup> auditor and employee	0	0	2	0	0	0
Inspector, <sup>1</sup> director, auditor and employee	0	0	0	1	0	1
Inspector <sup>1</sup>	0	0	0	0	0	1

<sup>1</sup> Refers to State and Federal warehouse inspectors.

Banks for Cooperatives that all cooperatives with outstanding loans obtain an unqualified audit report may be the reason for the importance of auditors in taking inventory. In an unqualified report, the auditor places his professional reputation behind the accuracy of all parts of the financial statements he has reviewed. In a qualified audit report, the auditor does not certify the complete accuracy of the inventory, but excludes specific items, for example, accounts receivable and inventories.

It is not the specific function of State and Federal warehouse inspectors to take part in the inventory process, but it is the responsibility of these individuals to periodically inspect the inventories of warehouses operating under the United States Warehouse Act. If there is a discrepancy between the amount of grain on hand as calculated by the warehouse inspector and the book inventory, many of the cooperatives adjust their books to agree with the warehouse examiner's findings.

The number of people involved in taking inventory ranged from an average of 2.5 in

Area VI to 4.7 in Area II. Since many of the elevators operate farm supply businesses in conjunction with their grain facilities, it may be assumed that some of these same people also take inventory of farm supplies.

## Methods of Taking Inventory

The weigh-up method and the measurement method are the dominant means of taking grain inventories. The weigh-up method is more accurate but is relatively expensive because it requires physical handling of grain and there is some physical loss when grain is moved.

The measurement method was used by 45 percent of the cooperatives taking inventory of grain in upright facilities and by 64 percent taking inventory of grain in flat facilities (table 8).

The majority of the organizations that operated both upright and flat storage facilities used the measurement method for both types

TABLE 8.--Methods of taking grain inventories, selected local farmer grain cooperatives, 1964-65

Area	Upright storage <sup>1</sup>				Flat storage <sup>1</sup>			
	Weigh-up	Measure	Both	Other	Weigh-up	Measure	Both	Other
	<u>Number of respondents</u>							
I	12	14	6	1	3	2	0	2
II	15	18	11	0	2	17	0	8
III	10	20	1	0	0	10	0	1
IV	6	24	5	0	0	20	0	2
V	30	1	3	0	5	7	2	4
VI	<u>5</u>	<u>9</u>	<u>2</u>	<u>0</u>	<u>2</u>	<u>3</u>	<u>1</u>	<u>1</u>
Total	78	86	28	1	12	59	3	18

<sup>1</sup> 46 percent of the respondents operated upright and flat facilities, 53 percent operated only upright facilities, and 1 percent operated only flat facilities.

of storage. Area V was the only exception. The majority of the elevators in Area V weighed the grain in upright facilities, and measured the grain in flat storage.

## Reconciling Books

As stated previously, the purpose of taking inventory is to verify the amount of inventory that is shown on the books of the cooperative. When there is a discrepancy between the book inventory and the results of the inventory-taking process, the books may be reconciled or adjusted to correct the error. But many cooperatives do not adjust their books unless the actual inventory shows a discrepancy greater than a predetermined percentage of the book inventory. Book inventory figures were adjusted to correct for any discrepancy by 34 percent of the cooperatives, but 33 percent allowed a tolerance of between 0.1 and 0.5 percent of the book inventory and 33 percent allowed higher levels (table 9).

The level of tolerance was lower in Areas IV, V, and VI than in Areas I, II, and III. In Areas IV, V, and VI, 45 percent of the cooperatives reported that they allowed no discrepancy to exist, compared with 24 percent

in Areas I, II, and III. Fourteen percent of the cooperatives in Areas I, II, and III, compared with only 9 percent in Areas IV, V, and VI, allowed discrepancies up to 2 percent of the book value.

TABLE 9.--Level of tolerance allowed between book inventory and the physical inventory, selected local farmer grain cooperatives, 1964-65

Area	Level of tolerance as a percentage of book inventory			
	0	0.1 to 0.5	0.6 to 1.0	1.1 to 2.0
	<u>Percent of respondents</u>			
Areas:				
I	22	44	17	17
II	21	32	37	10
III	29	29	29	13
IV	36	41	9	14
V	54	23	23	0
VI	56	11	22	11
All	34	33	22	11

## INVENTORY PRICES

Correct pricing of grain inventories is just as important to the accuracy of the balance sheet and operating statement of a cooperative as the correct determination of the quantity of grain on hand. The function of pricing is to give the grain inventory a dollar value to use in preparing the balance sheet and operating statement. An over- or undervaluation of the grain inventory has the same effect on the statement of operation and the balance sheet as over- or under-stating the amount of grain on hand.

### Methods of Pricing

Five methods of inventory pricing are commonly in use in cooperative elevators: (1) closing central market price, (2) cost, (3) closing central market less freight, (4) the lower of cost or closing central market, and (5) the lower of cost or closing central market less freight.

All of these methods are based on market price, cost, or both. In the market price



method, the amount of money necessary to replace an inventory is calculated. In the cost method, the actual price paid for the inventory is determined.

The cost method may be determined by one of the following ways: (1) assuming that the grain inventory on hand is the last that was received, and basing the price on the cost of that grain; (2) assuming that the grain inventory is the first grain that was received in the period, and basing the price on the cost of that grain, or (3) calculating a weighted average of the cost of all grain received during a period and applying this price to the inventory.

In any of the methods, the price should be adjusted to compensate for any change in the condition of the grain. It is also important that the same method of pricing be used in each period to insure uniformity in the financial reports.

## Selecting a Pricing Procedure

No one method of valuing inventory is suitable for all cooperatives. It is the responsibility of the board of directors to set forth a definite policy for establishing and administering a pricing policy that best suits the needs of the cooperative. The policy selected should include all quality factors that would normally be considered in the actual marketing of the grain inventory.

The "cost" method of pricing was selected by 38 percent of the respondents. This method was the most frequently used in each area except Areas II and VI (table 10). Next in popular use was the "closing central market less freight" method.

The selection of a pricing method usually rests with the directors, managers, auditors, or a combination of these. It is their respon-



Three ducts which are a part of the aeration system of a flat storage grain facility. The purpose of the ducts is to maintain good quality grain during storage.

sibility to weigh the advantages and disadvantages of each method as it applies to a particular cooperative. In all areas except Area V, the manager was most likely to have this responsibility. In Area V, more cooperatives gave this responsibility to the auditors (table 11). The leading combinations were managers and auditors, followed by directors and managers. In Area V, 17 of the 34 cooperatives in the study had their grain inventories priced by auditors, most of whom used the "cost" method.

Few cooperatives change their methods of pricing inventories. Each of the cooperatives studied was asked if it had changed the basis for inventory pricing in the last 5 years. The answer was overwhelmingly in the negative--only 3 percent of the respondents indicated there had been a change. Most of these changes were associated with a change in management.

TABLE 10.--Basis for pricing grain inventories, selected local farmer grain cooperatives, 1964-65

Area	Closing central market	Cost	Closing central market less freight	Lower of cost or closing central market	Lower of cost or closing central market less freight	Total
	<u>Number of respondents</u>					
I	7	16	4	5	2	34
II	6	11	9	4	15	45
III	4	10	3	2	3	22
IV	3	17	8	3	10	41
V	2	17	15	0	2	36
VI	<u>2</u>	<u>4</u>	<u>11</u>	<u>1</u>	<u>4</u>	<u>22</u>
Total	24	75	50	15	36	200

TABLE 11.--Responsibility for determining the basis for pricing grain inventories, selected local farmer grain cooperatives, 1964-65

Responsibility	Area						
	I	II	III	IV	V	VI	Total
	<u>Number of respondents</u>						
Managers	16	20	13	15	9	11	84
Auditors	8	6	8	7	17	4	50
Managers and auditors	4	9	3	8	4	1	29
Directors and managers	2	1	3	4	3	0	13
Directors	4	1	2	2	1	0	10
Directors, auditors, and managers	0	5	2	1	0	0	8
Directors and auditors	<u>0</u>	<u>1</u>	<u>1</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>2</u>
Total	34	43	32	37	34	16	196





Quality is important for inventory control and valuation. An employee of a county elevator is testing wheat samples.

## Grain Quality in Pricing Inventories

The price used to value grain inventories should be adjusted to reflect the actual quality of the grain on hand. In this quality adjustment, all characteristics of the grain that affect its market price should be considered.

Of the 194 respondents, 14 (7 percent) reported that inventory valuation incorporated all grade factors. Forty-five (23 percent) of the respondents did not recognize any quality characteristics in pricing grain.

Test weight was the single quality factor most commonly considered in all areas (table 12). The combination of quality factors most commonly considered was moisture, dockage, and test weight. The amount of protein was not usually considered. Cooperatives in Areas V and VI were more concerned with protein and less with moisture than the other cooperatives.

TABLE 12.--Quality factors most commonly considered in valuating grain inventories, selected local farmer grain cooperatives, 1964-65.

States	Factor or factors considered	Percent of area respondents
Area I Ind., Ill., Mich., Ohio	Moisture Moisture, dockage, and test weight	22 28
Area II Iowa, Minn.	Moisture and test weight Moisture, dockage, and test weight	23 21
Area III Okla., Tex.	Test weight Moisture, dockage, and test weight	25 20
Area IV Col., Kan., Neb.	Test weight Moisture, dockage, and test weight	26 18
Area V Mont., N. Dak. S. Dak.	Test weight Protein, dockage, and test weight	15 35
Area VI Idaho, Oreg. Wash.	Test weight Dockage and test weight	25 25

# SHRINKAGE OF GRAIN INVENTORIES

Handling and storing grain always results in some physical loss. This loss frequently occurs from abrasion of kernels and spillage of grain. The amount of actual shrinkage is affected by the kind of grain, length in storage, kind of facilities, amount of handling, weather, and other factors. Many elevator managers anticipate these losses by estimating the amount of shrinkage that will occur over a period of time and take this into account when making managerial decisions.

## Estimating Shrinkage

The estimated shrinkage of grain inventory is usually calculated as a percentage of the total amount of grain received during the fiscal year, the amount of grain on hand at the end of the fiscal year, or the monthly receipts of grain. The shrink factor may be based on published tables but many managers prefer to rely on records of shrinkage in their own facilities.

The cooperatives surveyed reported applying shrink factors ranging up to 2 percent of total grain handled, fiscal yearend inventory, or monthly receipts. A shrink factor of 0.5 percent or less was most frequently used for wheat, corn, soybeans, barley, rye, and oats (table 13).

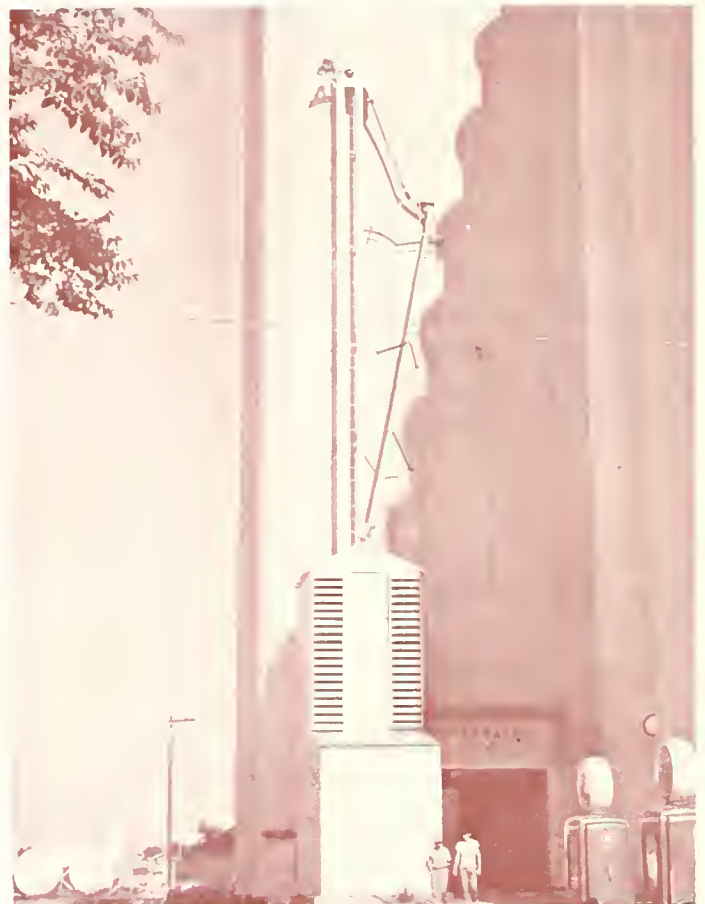
Fifty percent of the respondents reported that shrink factors were determined by past experience and 7 percent that they used published tables. The remainder of the study group reported using various methods.

## Trend in Shrinkage

As the grain industry becomes more competitive, the amount of shrinkage becomes increasingly important to the cooperative elevator. When the respondents were asked if the shrinkage of stored grain had increased, de-

creased, or stayed the same since 1960, 76 percent reported there had been no change, 18 percent that there had been an increase, and 6 percent that there had been a decrease.

Many grain elevators have installed aeration, dust control, and grain dryer systems in the last few years in an effort to maintain good quality grain. The cooperatives in the study group were asked to report the effect of this equipment on the shrinkage of grain inventories. The majority of the respondents reported that all the grain conditioning devices increased the amount of shrinkage (table 14). However, 15 percent of the respondents reported that aeration systems reduced the amount of shrinkage, and small percentages thought dust control and grain dryer systems had the same effect.



Harvesting grain faster with a high moisture level requires larger elevators equipped with a dryer. The dryer helps to maintain the quality of the grain stored in the elevator by lowering the moisture content.

TABLE 13.--The application of shrink factors to grain inventories, selected local farmer grain cooperatives, 1964-65

Grain and shrink factor (percent)	Respondents	Shrink factor applied o--			
		Total handled	Fiscal yearend inventory	Monthly receipts	Total
	<u>No.</u>	<u>Percent of respondents</u>			
Wheat:					
0-0.5		38	10	24	72
0.6-1.0		12	5	8	25
1.1-2.0	—	<u>0</u>	<u>3</u>	<u>0</u>	<u>3</u>
Total	60	50	18	32	100
Grain sorghum:					
0-0.5		19	6	18	43
0.6-1.0		18	12	21	51
1.1-2.0	—	<u>3</u>	<u>0</u>	<u>3</u>	<u>6</u>
Total	33	40	18	42	100
Corn:					
0-0.5		27	8	23	58
0.6-1.0		16	6	18	40
1.1-2.0	—	<u>0</u>	<u>0</u>	<u>2</u>	<u>2</u>
Total	49	43	14	43	100
Soybeans:					
0-0.5		40	0	12	52
0.6-1.0		8	12	20	40
1.1-2.0	—	<u>0</u>	<u>4</u>	<u>4</u>	<u>8</u>
Total	25	48	16	36	100
Barley:					
0-0.5		41	6	17	64
0.6-1.0		18	3	12	33
1.1-2.0	—	<u>0</u>	<u>0</u>	<u>3</u>	<u>3</u>
Total	34	59	9	32	100
Rye:					
0-0.5		20	10	30	60
0.6-1.0		20	0	20	40
1.1-2.0	—	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total	10	40	10	50	100
Oats:					
0-0.5		25	4	20	49
0.6-1.0		18	11	11	40
1.1-2.0	—	<u>2</u>	<u>2</u>	<u>7</u>	<u>11</u>
Total	45	45	17	38	100

TABLE 14.--The effect of elevator equipment on shrinkage, selected local farmer grain cooperatives, 1964-65

Area	Aeration			Dust control			Grain dryers		
	Increases	No change	Decreases	Increases	No change	Decreases	Increases	No change	Decreases
	<u>Number of respondents</u>								
I	9	3	1	1	3	0	10	1	1
II	17	8	1	10	11	1	18	11	3
III	6	4	6	5	3	1	8	0	1
IV	14	8	5	17	8	2	17	6	2
V	4	2	1	4	2	0	4	3	0
VI	<u>3</u>	<u>3</u>	<u>0</u>	<u>5</u>	<u>2</u>	<u>1</u>	<u>5</u>	<u>2</u>	<u>0</u>
Total	53	28	14	42	29	5	62	23	7

Only in Areas I and II did the majority of the respondents take the position that dust systems had no effect on shrinkage. But closer analysis shows that 50 percent of those cooperatives stating that a particular device had decreased the amount of shrinkage also reported that they operated at least one of the other two devices which they believed caused an increase in the shrinkage of grain.

The problem of proper inventory control and valuation is composed of three elements--

measurement, pricing, and the accounting for shrinkage. These items must be handled with equal degrees of competency.

Recognition of the importance of suitable and consistent methods of inventory measuring, pricing and allowance for shrinkage will make a basis for more accurate information and therefore, provide for more equitable treatment of patrons.





## OTHER PUBLICATIONS AVAILABLE

Using Your Co-op Elevator, Educational Circular 8.

Cooperative County Elevators in Montana, FCS Gen. Rpt. 64, Francis P. Yager.

Grain Cooperatives, Bul. Reprint 1, Daniel H. McVey.

Economics of Flat Grain Storage Facilities in Kansas, Mktg. Res. Rpt. 685, W. Robert Summitt and L. Orlo Sorenson.

What Influences Off-Farm Grain Sales in Missouri? FCS Gen. Rpt. 91, Francis P. Yager.

Country Elevators, Cost Volume Relations in the Spring Wheat Belt, FCS Serv. Rpt. 63, Francis P. Yager.

A copy of each of these publications may be obtained upon request, while a supply is available from:

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